CLAIMS

1. An optical compensatory element comprising:

a support;

at least one first optically anisotropic layer derived from at least one of inorganic materials and arranged on or above at least one side of the support; and

at least one second optically anisotropic layer derived from at least one of polymerizable liquid crystal compounds and arranged on or above at least one side of the support.

2. The optical compensatory element according to claim 1, wherein both the first optically anisotropic layer and the second optically anisotropic layer are arranged on or above at least one side of the support.

3. The optical compensatory element according to any one of claims 1 to 2,

wherein the first optically anisotropic layer is an alternatively multilayered structure comprising a repeating unit, the repeating unit comprising plural layers having different refractive indices and being arranged in a regular order,

wherein the repeating unit has an optical thickness less than the wavelength of light in the visible region, and

wherein the optical compensatory element as a whole exhibits a negative anisotropy in refractive index.

4. The optical compensatory element according to claim 3,

wherein the repeating unit constituting the alternatively multilayered structure comprises two different layers having different refractive indices, and

wherein the difference in refractive index in the visible region between the two layers is 0.5 or more.

5. The optical compensatory element according to any one of claims 3 to 4, wherein the repeating unit constituting the alternatively multilayered structure comprises oxide layers.

6. The optical compensatory element according to claim 5, wherein the repeating unit constituting the alternatively multilayered structure comprises a SiO_2 layer and a TiO_2 layer.

7. The optical compensatory element according to any one of claims 1 to 6, wherein the first optically anisotropic layer has a retardation Rth represented by following Equation (1) of 20 nm to 500 nm:

$$Rth = \{(n_x+n_y)/2-n_z\} \times d \qquad \text{Equation (1)}$$

wherein n_x, n_y and n_z are refractive indices in the X, Y and Z axes in the first optically anisotropic layer, respectively, where the X, Y and Z axes are orthogonal to one another, provided that the direction of the normal to the support is defined as the Z axis; and "d" is the thickness of the first optically anisotropic layer.

8. The optical compensatory element according to any one of claims 1 to 7,

wherein the second optically anisotropic layer comprises a polymerizable liquid crystal compound having a liquid crystal structure, and

wherein the angle of alignment of the liquid crystal structure in the polymerizable liquid crystal compound is fixed, as a result of polymerization, as being oblique to a thickness direction of the second optically anisotropic layer.

9. The optical compensatory element according to claim 8, wherein the liquid crystal structure in the polymerizable liquid crystal compound is in a hybrid alignment in which the angle of alignment varies in a thickness direction of the second optically anisotropic layer.

10. The optical compensatory element according to any one of claims 8 to 9, wherein the liquid crystal structure in the second optically anisotropic layer is aligned in a certain direction.

11. The optical compensatory element according to any one of claims 8 to 10, wherein the second optically anisotropic layer comprises two layers having different direction of alignments.

12. The optical compensatory element according to claim 11, wherein the two layers having different direction of alignments and serving as the second optically anisotropic layer are arranged on or above one side of the support.

13. The optical compensatory element according to claim 11, wherein

the two layers having different direction of alignments and serving as the second optically anisotropic layer are arranged so as to sandwich the support.

14. The optical compensatory element according to any one of claims 11 to 13, wherein the second optically anisotropic layer comprises two layers having direction of alignments perpendicular to each other.

15. The optical compensatory element according to any one of claims 8 to 14, wherein the polymerizable liquid crystal compound comprises a discotic liquid crystal structure.

16. The optical compensatory element according to any one of claims 8 to 14, wherein the polymerizable liquid crystal compound comprises a rod-shaped liquid crystal structure.

17. The optical compensatory element according to any one of claims 1 to 16, which is used for a liquid crystal projector.

18. A method for manufacturing an optical compensatory element, comprising :

laminating plural layers in a regular order on or above a support, the plural layers each comprising at least one of inorganic materials and having different refractive indices; and

polymerizing a polymerizable liquid crystal compound having a liquid crystal structure while keeping the liquid crystal structure being aligned.

19. A liquid crystal display, comprising:

a liquid crystal device comprising at least one pair of electrodes and liquid crystal molecules encapsulated in between the at least one pair of electrodes;

an optical compensatory element arranged on or above at least one side of the liquid crystal device; and

at least one polarizing element facing the liquid crystal device and the optical compensatory element,

wherein the optical compensatory element is an optical compensatory element according to any one of claims 1 to 17.

20. The liquid crystal display according to claim 19, wherein the liquid crystal device is a twisted nematic liquid crystal device.

21. A liquid crystal projector comprising:

a liquid crystal display;

a light source for applying light to the liquid crystal display; and

a projection optical system for forming an image on a screen from light optically modulated by the liquid crystal display,

wherein the liquid crystal display is a liquid crystal display according to any one of claims 19 to 20.